



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,847	08/18/2003	Hamid Reza Abutalebi	881-011446-US(PAR)	4018
2512 PERMAN & GREEN 425 POST ROAD FAIRFIELD, CT 06824	7590 07/08/2009		EXAMINER JAMAL, ALEXANDER	
			ART UNIT	PAPER NUMBER
			2614	
			MAIL DATE	DELIVERY MODE
			07/08/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/642,847

**Applicant(s)**

ABUTALEBI ET AL.

**Examiner**

ALEXANDER JAMAL

**Art Unit**

2614

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-12,16-22,24-27 and 29-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. Based upon the submitted amendment filed via RCE, the examiner notes that claims 1 and 12 have been amended and claims 2-4,13-15,23,28 are cancelled.
2. The examiner notes prior art patent to Eran (6862326), which also teaches whitening with both a spectral emphasis (matched) filter and decimation.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. **Claims 1-32** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per **claims 1,12** and depending claims. The claims recite an operating step where the input to an adaptive filter is whitened by decimation and also whitened by spectral emphasis. It is not clear what order these processing stages are as only one whitening stage can be performed on the signal directly before it is input into the filter. It is not clear if the stages are operating in series and if so, in which order. For the purpose of examination, the examiner assumes the claim language is changed to recite that the spectral emphasis stage occurs, and then the decimation whitening step occurs and then the signal is input.

Clarification/Correction is requested.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1,5-12,16-32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Makino et al (6246760), and further in view of Brennan et al. (6240192).

As per **claim 1**, Makino discloses a subband echo canceller that processes an audio signal in the frequency domain to synthesize an echo estimate to cancel the echo (undesired signal) from the incoming signal (Fig. 7). As per Fig. 5, the system inherently comprises a stage to output an echo cancelled signal in the time domain for the purpose of being able to drive the speakers with echo cancelled signals. Makino discloses that the subband signals are whitened in order to increase convergence (Col 3 lines 25-35). Makino discloses that the system includes decimation of the input samples to increase convergence speed (Col 5 lines 15-35). Decimation inherently (by definition) will whiten a signal. Makino additionally discloses a whitening filter (spectral emphasis) stage for

the received signal (fig. 16). However, Makino does not specify producing and analyzing a primary and reference signal (the 'primary signal' and 'reference signal' as defined by applicant's specification) in order to produce the frequency domain subband signals.

Brennan discloses a method of improved subband processing for hearing aid functions such as noise reduction (echo cancellation) (Col 1 lines 35-55). Brennan discloses that the method provides for a more efficient processing (Col 2 lines 10-25). The process involves an analysis and synthesis filter stages Fig. 1 that comprise a primary signal (going into filter bank 26) and a reference signal (coming out of filter bank 26) to produce frequency domain subbands. It would have been obvious to one of ordinary skill in the art at the time of this application to implement the subband processing of Brennan in the subband echo canceling system of Makino (including the decimation and spectral emphasis) for the advantage of improved processing efficiency.

As per **claim 12**, it is rejected as per the claim 1 rejection.

As per **claims 5,6,16,17**, Makino discloses using the affine projection algorithm (Col 2 lines 30-45) which is an LMS algorithm.

As per **claims 7,19**, (col 1 lines 15-25) Makino discloses that the system uses double talk detection to adjust the adaptation.

As per **claims 8,20**, the step size is controlled (Col 2 lines 20-30).

As per **claim 9**, the analog/digital converters disclosed by Brennan inherently have a frequency response (determined by the sampling frequency). This will act to filter out noise (correlated and non-correlated) non-adaptively.

As per **claims 10,21**, Brennan's subband method comprises two adaptive filters per subband (26,30 in Fig. 1) and is crosstalk resistant.

As per **claims 11,22**, the signal is a noise signal (echo).

As per **claims 23-25,27-30,32**, Brennan's produces oversized samples, performs WOLA, synthesis and analysis, produces frequency domain samples, Makino discloses that the frequency domain samples are processed in the echo canceller system (claim 1 rejection),

and as such would obviously use the frequency domain samples from the Brennan system. Brennan's system produces oversampled subband signals and a synthesis filterbank.

As per **claims 26,31**, the echo canceller of Brennan acts to adapt filter coefficients to produce an echo estimate to be subtracted from the near-end signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498, and whose email address is alexander.jamal@uspto.gov

The examiner can usually be reached on M-F 8AM-5PM.  
If attempts to reach the examiner by telephone or email are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499.

The fax phone numbers for the organization where this application or proceeding is assigned are **571-273-8300** for regular communications and **571-273-8300** for After Final communications.

/Alexander Jamal/

Primary Examiner, Art Unit 2614

Examiner Alexander Jamal

July 7, 2009